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Sponsor: US ARMY CORPS OF ENGINEERS
Title: COLLECTION OF DIGITAL AERIAL IMAGERY IN SUPPORT OF AQUATIC INVASIVE SPECIES PROGRAM AND CERP
Dollars: $631,850.00
Synopsis:

Aerial imaging serves as a fundamental intermediary between satellite imagery and ground-based observations. Unmanned aircraft (UA) provide a method of obtaining aerial imagery without the added risk of putting a human life in the air. An interdisciplinary team of researchers at the University of Florida, with funding from the U.S. Army Corps of Engineers, US Geological Survey, US Fish and Wildlife Service, FL Fish and Wildlife Conservation Commission, has developed the Nova 2.1 small Unmanned Aircraft System (sUAS) designed specifically as a low-cost, autonomous, aerial imaging tool for ecological research and monitoring.

Through an evolution of experience, UF has developed a sUAS photographic platform in support of the Corps' operational missions throughout Florida. The design and construction of both an amphibious UA and an optical payload capable of repeatedly working over Florida's aquatic environments presented a series of challenges elevating the difficulty of the endeavor. Additionally, the Federal Aviation Administration (FAA) has continued to be slow in integrating UAs into the National Airspace System (NAS) which has introduced further delays. However, through our partnership with the USACE, the UF sUAS research team has been able to secure Certificates of Airworthiness (COA) from the United States Army Aviation Directorate (USAAD) for our Nova series of UAs, and through the USAAD's Memorandum of Agreement (MOA) with the FAA, the UF/USACE partnership is able to fly low altitude missions throughout large portions of the south Florida NAS, including Lake Okeechobee and the Everglades. The FAA obviates flying sUAS >366 m (1,200 ft) above sea level and beyond 1 nautical mile line-of-sight from the operator. Areas of invasive vegetation infestations are generally many miles from appropriate land-based launch and recovery sites, therefore, the sUAS has to be transported to the remote field location, often by boat, and hand launched to be operated legally within FAA restrictions. The UF team has developed the capability to address operational missions of the USACE by combining pilots, ground control operators, mission planners, and photogrammetry experts at UF with USACE airboats, airboat operators, and qualified visual observers. Operational targets of interest for the USACE Jacksonville District have included the identification, location, and spread of invasive aquatic plants, effects of herbicide treatments on said plants, and changes in plant community structure over time. Additional operational targets of interest for the USACE have included sUAS aerial imagery flights over water control structures such as levees and pump stations, as well as construction and maintenance of these facilities. The UF sUAS team has the experience of collecting aerial imagery over all of these target types, and is poised to develop additional research applications.